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Meeting Minutes Transmittal/Approval
Tri-Party Agreement, Single-Shell Tank
Meeting of Unit Managers
345 Hills Street, Conference Room 28, Richland, Washington

October 9, 1991

From/
Appvl: _____ Date: _____
June Hennig, SST Point of Contact, DOE-RL

Appvl: Megan Lerchen Date: 10/21/91
Megan Lerchen, SST Unit Manager
Washington Department of Ecology

Appvl: Doug Sherwood Date: 12/2/91
Doug Sherwood, SST Unit Manager
EPA Region X

To:
R. Izatt, DOE-RL
R. Gerton, DOE-RL
R. Freeberg, DOE-RL
S. Wisness, DOE-RL
T. Nord, Ecology
P. Day, EPA Region X
H. Harmon, WHC
D. Newland, WHC
T. Veneziano, WHC
R. Wojtasek, WHC
M. Korenko, WHC
E. Gerber, WHC
All Attendees

Meeting Minutes are attached. Minutes are comprised of the following:

Attachment #1 - Meeting Summary/Summary of Action Items & Agreements
Attachment #2 - Agenda
Attachment #3 - List of Attendees
Attachment #4 - Presentation Materials
Single-Shell Tanks Stabilization/Isolation
Single-Shell Tank Retrieval Technology
Single-Shell Tank Closure/Corrective Action Work Plan
Single-Shell Tank Characterization

Meeting of Unit Managers
345 Hills Street, Conference Room 28, Richland, Washington

October 9, 1991

Attachment 1

MEETING SUMMARY/SUMMARY OF ACTION ITEMS AND AGREEMENTS

David Pabst (WHC) - **Introductions, Single-Shell Tank Meeting of Unit Managers**
The meeting commenced at 12:15 p.m. WHC provided opening comments and reviewed the agenda. This was followed by introducing the attendees.

Rick Raymond (WHC) - **Stabilization and Isolation Status**
WHC apprised attendees of the status of single-shell tank stabilization and isolation activities. The current status of stabilization was described as being on hold resulting from a DOE-HQ order to halt stabilization pending a Secretary of Energy determination that no safer alternative to stabilization exists. It was announced that DOE-RL had received the Secretarial Determination on October 8, 1991, and was in the process of directing WHC to resume stabilization activities of 241-BY and 241-C tank farms. WHC estimated that the stabilization of four tanks in these two farms would start by October 11, 1991, and could be completed within approximately 45 days

Ecology was under the impression that stabilization within 241-C tank farm would lead to adding waste to SST C-103, a watch list tank. WHC responded that high level waste would not be added to this tank as a result of normal pumping, but that small amounts of rinse water would be added as a result of flushing the transfer system at the conclusion of pumping activities.

WHC described the status of isolation activities. Although not a near-term TPA milestone, WHC strives to isolate the same number of SSTs as were stabilized the previous fiscal year. Four SSTs were isolated by September 30, 1991, which corresponds to the four SSTs stabilized by the end of FY 1990.

The condition of 241-S tank farm was described by WHC, supported by photographs (included in presentation materials.) The equipment in the farm is in much worse condition than anticipated by WHC in planning the task, and is very different from the "as-built" drawings of the farm. This situation is impacting the ability of WHC to commence stabilizing the SSTs in 241-S farm, required to support the FY 1992 TPA Interim Milestone.

The severe condition in the 241-S tank farm has not been encountered before by WHC in its stabilization activities. Ecology queried if the condition was unique to the 200 West area, or endemic to the entire tank farm project. WHC and DOE-RL took an action to respond to this question.

Jim Berger (WHC) - **Single-Shell Tank Retrieval Technology**

The TPA Milestones associated with this topic were discussed. The detailed definition of completion and of the deliverables is a matter that requires completion in the near term. DOE-RL and WHC are in the process of developing their recommendations, and will be requesting a meeting with the Regulators in the latter part of November, 1991, to complete this action. November 20, 1991, was suggested as a date for this meeting, but no commitment was made by any party.

The Robotics Test Bed was described, accompanied by several photographs of the equipment installed and being used for robotics development. The Regulators were invited to a demonstration of the test bed on November 7, 1991.

R. Todd Miller (WHC) - **Single-Shell Tank Closure/Corrective Action Work Plan**
WHC provided information on the process of updating the Closure/Corrective Action Work Plan. The first revision to this plan is scheduled for submittal to Ecology and EPA by September 30, 1992. Comments on the NOD resulting from the original Closure/Corrective Action Work Plan are requested from Ecology by October 31, 1991, to not impact the development of the revision. DOE-RL has been awaiting these comments for over nine months. Ecology stated that DOE-RL should proceed without comments at this time and incorporate its comments when they are provided at a later date. It is almost certain that the Ecology comments could not be provided by the requested date. WHC stated that it could proceed with work on the Plan, but that it must have Ecology comments by January 31, 1992, in order to not impact the process. Comments received from Ecology after the end of the year that conflict with the effort performed until that time will pose cost and schedule impacts to development of the Closure/Corrective Action Work Plan.

J. Clark (DOE-RL) - **Single-Shell Tank Characterization**
Mr. Clark introduced the topics to be covered under this portion of the presentation and introduced J. Propson (WHC).

WHC presented the core sampling baseline schedule, and the differences to the baseline. The FY 1991 milestone (M-10-04) was completed almost two months ahead of schedule. The lack of significant activity in the last event of double-shell tank 101-SY has allowed the acceleration of SST core sampling. Core samples were successfully taken from tank B-111 on October 4, 1991, ahead of the baseline schedule. Work is progressing for sampling tank T-111, which will be followed by BX-103, provided 101-SY has its next event in the late-November, early-December time frame, and provided no perturbations occur with SST core sampling between now and then. Additional planned variations to the baseline schedule were also provided.

A current situation which is perturbing the core sampling schedule is that 241-C farm is requiring the workers to be on fresh air. This is the result of fumes causing minor irritation to workers in the farm. Tests and analyses are on-going to ascertain the cause of these fumes.

<u>Action Item 10/9/91-01</u> Assignee: D. Pabst (WHC) Due Date: 10/11/91
Have a representative from Hanford Industrial Safety contact Ecology (M. Lerchen) and provide information regarding the testing and analysis being conducted on the fumes emanating from 241-C Farm.

closed (MLL)

Status: A.W. Lilly (WHC) called Ecology (Lerchen) and provided information on fumes in 241-C farm.

WHC discussed its action to update the Waste Characterization Plan and release revision 3 of that plan. The revised plan is being delivered to DOE-RL on 10/9/91, and is planned for review and release to the Regulators by 10/11/91. As this is a primary document (as defined in the TPA), it was requested that a standard 45 day review cycle be adhered to by the Regulators.

EPA (Sherwood) asked that the revised plan address organic sampling and analysis of tank wastes.

Ecology (Lerchen) stated that the revised plan may need to be processed for public review and comment prior to a response by Ecology.

Action Item 10/9/91-02 Assignee: M. Lerchen (Ecology) Due Date: 10/11/91
Contact DOE-RL (J. Clark) or WHC (Propson) regarding the need by Ecology to process the Waste Characterization Plan, Revision 3, for public review and comment, thereby increasing the time required for comment by Ecology.

Status: Closed. Ecology (Lerchen) replied to J. Propson (WHC) on 10/11/91 that the plan does require public review and comment.

WHC (Propson) again confirmed that the near term TPA Interim Milestones for SST Characterization will be met. Progress is being made towards meeting these commitments. M-10-05, "Issue 'Integrated Plan - Sampling and Analysis of Hanford Wastes Measuring Greater Than 10mREM per Hour,'" is being reviewed internal to WHC. M-10-06, "Obtain 20 Core Samples from Single-Shell Tanks," has already had two core samples taken. The second core sampling truck required for M-10-13, "Core Sampling Truck No. 2 Ready for Rotary Mode Drilling and Hard Salt Cake Sampling," is ready for operations, except for the rotary mode drilling apparatus. All three of these milestones are to be completed within FY 1992, and WHC projects that they will be met on schedule.

WHC (Minnette) provided status and information regarding the rotary mode drilling equipment. He stated that although a universal sampler design is the preferred approach, and that design for this approach is progressing well, an alternative design is being pursued as a contingency. This alternative approach includes a sludge sampler and a separate hard cake sampler. The latter approach would be employed if the universal sampler were to prove incompatible with the wastes requiring sampling. WHC had actual prototype equipment of the sampler for demonstration. The approaches being pursued by WHC allow for an increase in sample size from 200cc to approximately 350cc per sample.

WHC (Minnette) continued its presentation by describing the hard cake bit design and development activity. The bit design is now such that the bit can drill to within 1.5 inches of the bottom of a tank. The design process discussion was accentuated by a short video tape on the rotary mode drill bit design evolution. The current bit design was evidenced by an actual drill bit that was provided for hands-on examination, as was the current design for sampler ball-valve. The new design for the ball-valve requires cutting a core

in a single location, rather than previous designs which had required two cuts.

WHC (Minnette) discussed NPH reduction activities. WHC stated that by June of 1992, demonstration testing should be completed for an alternate means of achieving hydrostatic balance. Nitrogen would be used instead of NPH reducing or eliminating the complications surrounding sample analysis when NPH is utilized.

Action Item 10/9/91-03. Assignee: A. Noonan (WHC) Due Date: 12/1/91
Provide to the Regulators the methods and data demonstrating that NPH cleanup methods actually succeed in cleaning up NPH. Include laboratory results in the response.

DOE-RL (J. Clark) discussed actions it has taken with WHC in the area of Award Fee Goals specifically aimed at performance in the waste sampling and characterization activities.

DOE-RL (J. Clark) presented its new staffing levels and personnel in support of SST Characterization. It is believed that these new personnel will be better able to manage and influence the necessary activities to assure compliance with TPA requirements.

Action Item 10/9/91-04. Assignee: J. Hennig (DOE-RL) Due Date: _____
Provide to the Regulators the updated DOE-RL organization chart stating single-shell tank responsibilities and points of contact.

Status: This will be addressed as an agenda item at the next meeting of SST Unit managers.

The budget status for SST characterization was presented by DOE-RL (J. Clark). The status reflects that there is a budget shortfall of approximately $6.4 million for FY 1992, and that DOE-RL and WHC are requesting additional funding for the completion of core sample analyses and for additional characterization planning support.

David Pabst (WHC) - **General Discussion**

The next TPA Single-Shell Tank Meeting of Unit Managers will be held on November 21, 1991, at Richland, Washington. The specific time and agenda will be determined later. It was suggested that the agenda include a presentation of the "Aggregate Area Studies." DOE-RL will identify if a presentation of this material is best suited for the SST meeting, or some other meeting, supported by SST personnel. EPA requested that the next SST meeting include an overview of the sampling and analysis plan being developed for M-10-05.

EPA and Ecology stated that they perceived the level of information and detail provided at this meeting was adequate to be representative for future meetings of SST Unit Managers. Ecology stated a preference for short meetings.

This meeting of SST Unit Managers was brought to a close at 2:45 pm.

Meeting of Unit Managers
345 Hills Street, Conference Room 28, Richland, Washington

October 9, 1991

Attachment 2

AGENDA

AGENDA

TRI-PARTY AGREEMENT
SINGLE-SHELL TANK
MEETING OF UNIT MANAGERS

October 9, 1991
12:00 p.m. to 3:30 p.m.
345 Hills Street, Room 28
Richland, Washington

Time	Topic	Presenter DOE/Contractor
12:00	Introductions	Hennig/Pabst
12:10	Stabilization and Isolation Status	Bishop/Rainey
1:00	Retrieval Technology Development and Demonstration	Clark/Berger
1:45	Tank Farm Closure	Freeberg/Miller
2:15	Core Sampling and Characterization	Clark/Propson
3:15	Closing Comments	Hennig/Pabst
3:30	Adjourn	

Meeting of Unit Managers
345 Hills Street, Conference Room 28, Richland, Washington

October 9, 1991

Attachment 3

LIST OF ATTENDEES

ATTENDANCE
UNIT MANAGER MEETING
SINGLE-SHELL TANKS
OCTOBER 9, 1991

NAME	ORG.	ROLE	PHONE
Joe King	SWEC	GJSC	(509) 376-4726
Roy Barked	WHC	TD PROG SUPPT	(509) 376-9669
Jake R Laws	WHC	CLOSUM	(509) 376-7508
R Todd Miller	WHC	RCRA	(509) 376-2622
Jhivan Freeman	WHC	ENV. EWJ	(509) 376-1882
Pim Andringa	WHC	TWC	(509) 373-1023
Michael Minette	WHC	TWCT	(509) 373-3864
Al Noonah	WHC	TWCT	(509) 373-3879
Ellen Mattlin	DOE	TWCT	
Dave Pabst	WHC	TPA MILESTONE	(509) 376-4098
Brian Opitz	WCH	SST TECH INT.	(509) 373-9372
Tom Wood	PNL	WTECH.	(509) 376-8309
James Bergen	WHC	TECH DEV.	(509) 376-9942
GN Boechlec	WHC	ENJ	(509) 373-3041
Leela M. Sasaki	WHC	TWCT	(509) 373-1027
Vernon W. Hall	WHC	ER PROG OFFC	(509) 376-0286
Rick Raymond	WHC	SST TECH.	(509) 373-2785
John M. Clark	DOE-RL	M-10 UNT MGR	(509) 376-2246
Tom Rainey	WHC	SST PRGRMS	(509) 373-3531
Megan Lerchen	ECOLOGY	UNIT MNGR	(206) 438-3089
Guy Bishop	DOE	SST	(509) 373-2113
Johnnie Newson	DOE	SST	(509) 373-5951

NAME	ORG.	ROLE	PHONE
Doug Sherwood	EPA	SST UNT MNG	(509) 376-9529
Paula K. Clark	DOE	M-06/07	(509) 376-4718
Sandy Trine	DOE	SST	(509) 376-6943
Ed Smith	WHC	REG. ANALYSIS	(509) 376-0234
Mike Cahill	WHC	DWR	(509) 372-0474

Meeting of Unit Managers
345 Hills Street, Conference Room 28, Richland, Washington

October 9, 1991

Attachment 4

PRESENTATION MATERIALS

Milestone M-05-00

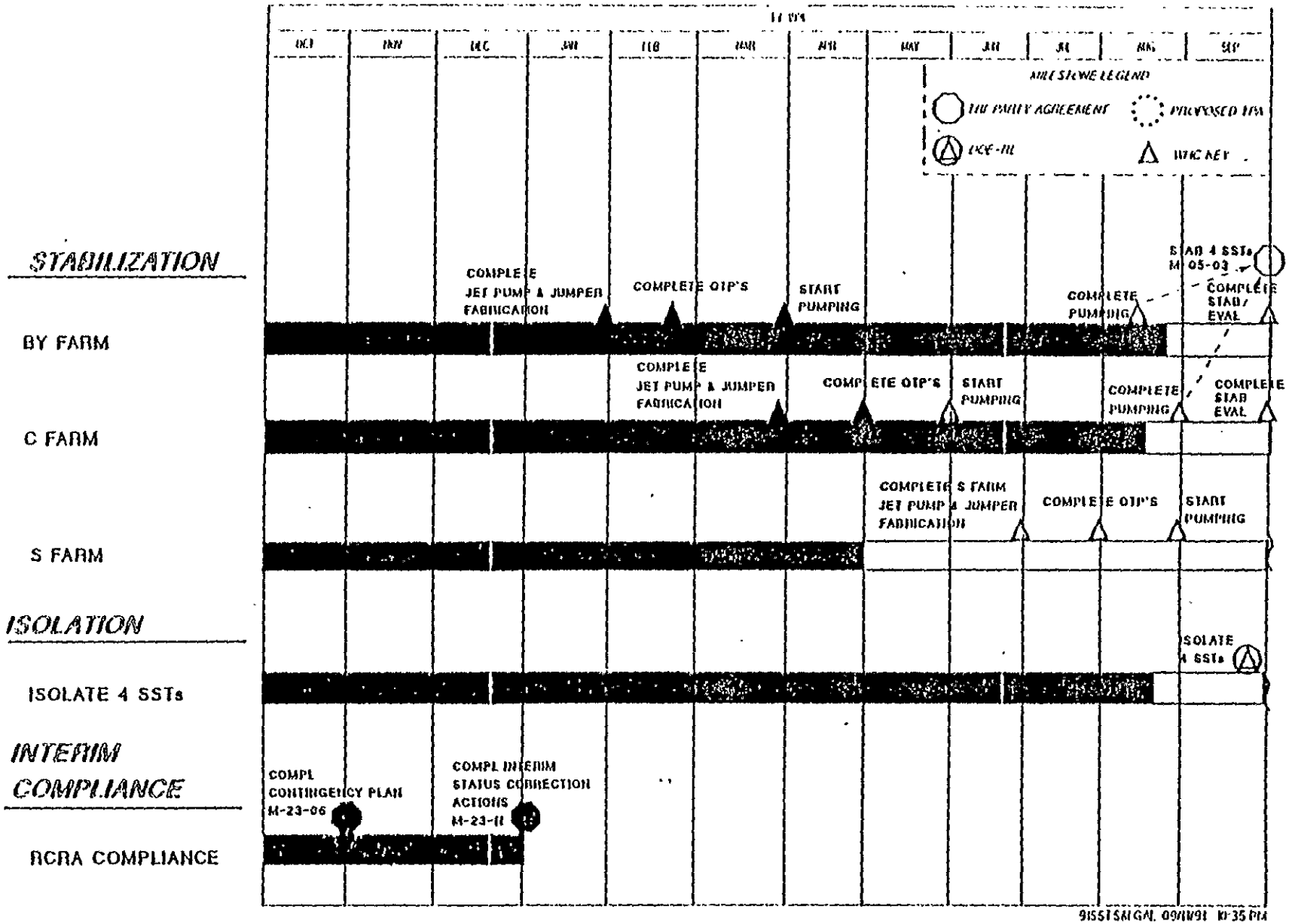
Single-Shell Tanks Stabilization/Isolation

T. E. Rainey

Unit Managers Meeting
October 9, 1991

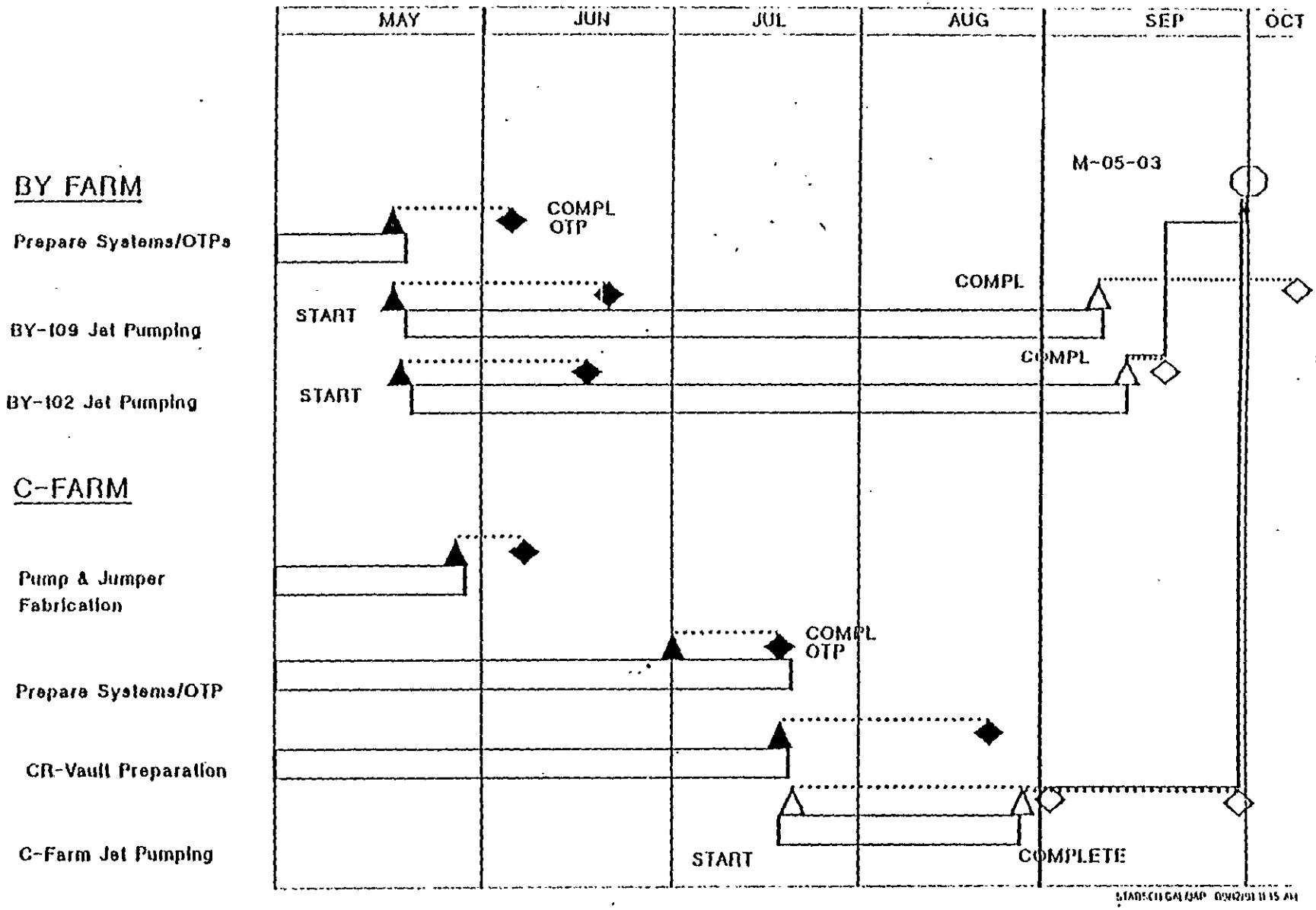
1W3B SST STABILIZATION & ISOLATION

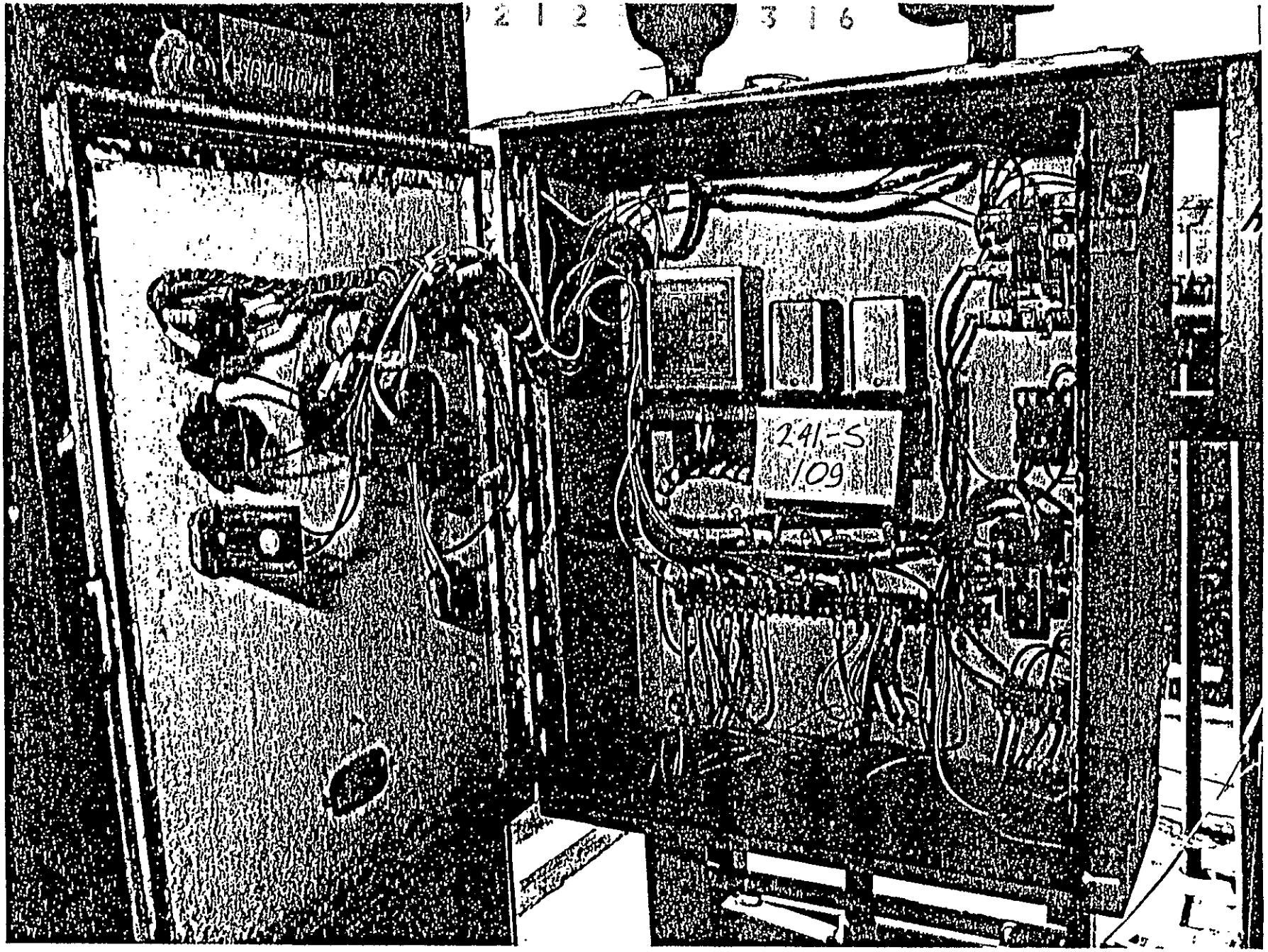
AUGUST



STABILIZATION RECOVERY SCHEDULE

AUGUST




241-S
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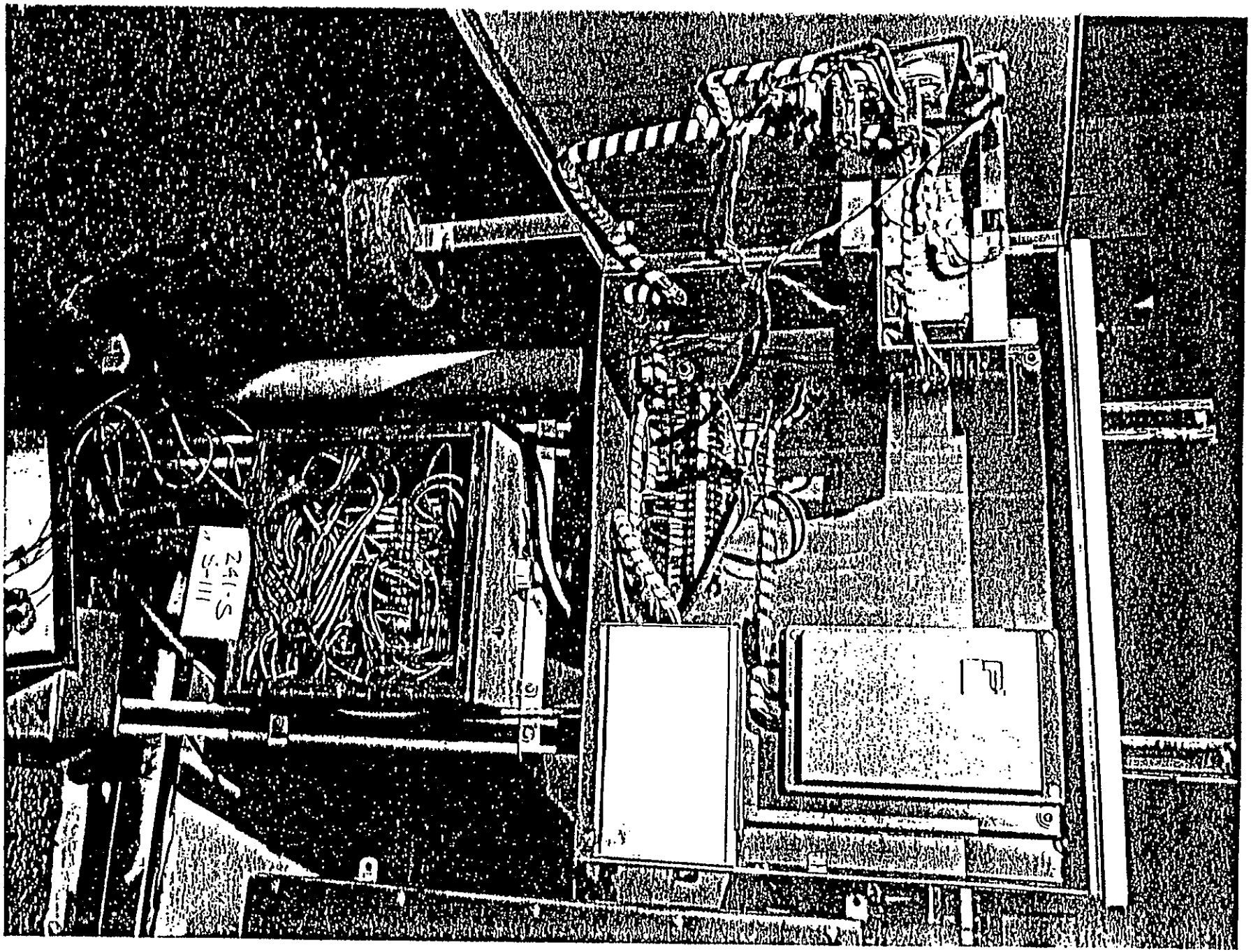

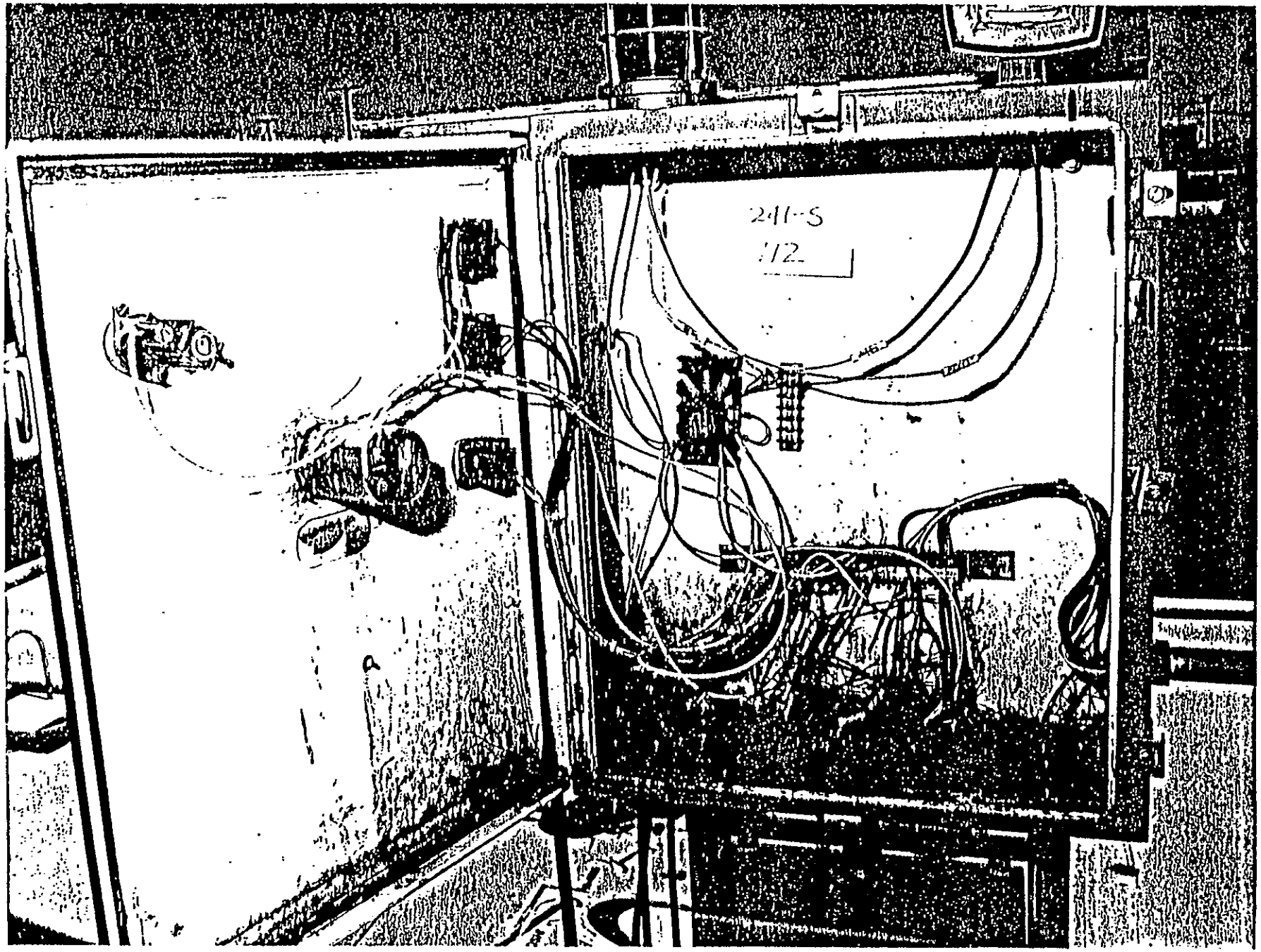
241-S
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Issues/Concerns

Issues/Concerns	Corrective Action Required
Pumping stopped on BY Farm and was not allowed to start in C Farm due to concerns of possible leaks into "watch list" tanks.	Secretary of Energy determine that in accordance with the Wyden Amendment, no safer alternative exists to accomodate transfers of waste, and authorizes restart of stabilization activities.
S Farm equipment deteriorated more than anticipated.	Apply resources to determine what's required to upgrade equipment.
Interim isolation field work delayed because of lack of resources.	Resources utilized on CR Vault were applied to isolation when C Farm was ready to pump.

Single-Shell Tank Retrieval Technology

Milestones: M-06-00/M-07-00

June Hennig, Unit Manager
Ken Bracken, Division Director

Technology Development Program

October 9, 1991

Milestone Description

• M-06-00	Develop single-shell tank waste retrieval technology and complete scale-model testing
• M-07-00	Initiate full-scale demonstration of waste retrieval technology
• Deliverables	Detailed agreement to be developed
• Next Milestone	Initiate waste retrieval testing in scale model tank - October 1992 (M-06-02)

Accomplishments(Last three months)

Underground Storage Tanks Robotics

- All equipment installed and integrated in Robotics Technology Test Bed
  - 3 Manipulators
  - 4 Remote sensor systems
  - 2 Video inspection/monitoring systems
  - A central control system
  - 4 Waste dislodging and removal tools

Accomplishments(Last three months, continued)

Underground Storage Tanks Robotics

- Have demonstrated the capabilities of key robotic retrieval systems
  - Multiple manipulators, sensors, and tools under control of a central computer control system
  - Sensor systems to map the tank waste surface
  - Primitive waste dislodging tools operated under automatic computer control

Accomplishments(Last three months, continued)

Waste Dislodging and Conveyance Systems

- Primitive end effectors designed and fabricated for robotics demonstration
- Waste retrieval system Installation and Operational Sequence document prepared
- Functions and Requirements document for the end effectors and conveyance system prepared
- End effector report prepared

Accomplishments(Last three months, continued)

Waste Retrieval Concept Development

- Completed Peer Review (WHC, SNL, INEL, PNL, ORNL) of Single-Shell Tank waste retrieval concepts

- Evaluated Alternative Concepts for Single-Shell Tank waste retrieval system

Planned Actions(next six months)

Underground Storage Tanks Robotics

- Hold robotics demonstration in November

- Initiate evaluation of additional waste dislodging tools

Planned Actions(next six months, continued)

Waste Dislodging and Conveyance Systems

- Prepare schedule for continued development of the waste dislodging and conveyance system technologies at SNL, LLNL, PNL, and WHC

- Evaluate the additional concepts and select preferred concepts

- Prepare a Test Plan for the development testing of the selected waste dislodging and conveyance system technologies

Planned Actions(next six months, continued)

Waste Retrieval Concept Development

- Identify and evaluate waste retrieval concepts other than robotics

- Issue functional requirements baseline for single-shell tank waste retrieval system

Special Topics

Required Action to Avoid Negative Impact to Milestone Cost or Schedule:

- **Reach agreement on milestone completion definition - DOE, Ecology, EPA**

SINGLE-SHELL TANK CLOSURE/CORRECTIVE ACTION WORK PLAN

WORK FOR FISCAL YEAR 1992

- Revise Closure/Corrective Action Work Plan
- Submit Revision 1 to Ecology by September 1992

SST CLOSURE/CORRECTIVE ACTION WORK PLAN REVISION SCHEDULE

	Start	End
Receive Ecology Comments on NOD Response Table		10/31/91
UMMs, Issue Resolution	11/01/91	12/31/91
Document Revision	1/01/92	6/30/92

SINGLE-SHELL TANK CHARACTERIZATION

- BASELINE CORE SAMPLING SCHEDULE
- U-110 REPORT
- WASTE CHARACTERIZATION PLAN REV. 3
- NEAR-TERM TPA MILESTONES
- ROTARY MODE SAMPLING DEVELOPMENT
- DOE-RL INITIATIVES
- DOE-RL STAFFING
- FY 1992 BUDGET

BASELINE INTEGRATED CORE SAMPLE SCHEDULE

REV 3

TANK No.	FY 91 Jun	Jul	Aug	Sep	FY 92 Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	FY93 Oct
B-202	(8 Seg/Core)																
B-201	(8 Seg/Core)																
SY-101 (H2/CC)	(22 Seg/Core)																
B-111	(5 Seg/Core)																
C-112 (FeCN)	(3 Seg/Core)																
C-109 (FeCN)	(2 Seg/Core)																
C-106 (HH)	(4 Seg/Core)																
C-110	(4 Seg/Core)																
SY-103 (H2/CC)	(15 Seg/Core)																
AW-103 (NCRW)	(13 Seg/Core)																
T-111	(9 Seg/Core)																
T-110 (H2)	(8 Seg/Core)																
AY-101 (CC)	(3 Seg/Core)																
AN-104 (H2)	(21 Seg/Core)																
BX-107	(7 Seg/Core)																
BX-103	(2 Seg/Core)																
AZ-102 (NCAW)	(4 Seg/Core)																
S-104	(6 Seg/Core)																

TPA Milestone M-10-04
4 Cores from 2 SSTs
(Achieved 8/3/91)

Current Status
10/4/91

TPA Milestone M-10-06
20 Cores from SSTs

Tank Waste Characterization Program

SST Core Sample

DST Core Sample

Schedule Includes Set-Up, Breakdown, and Decon Time

NEAR-TERM CORE SAMPLING SEQUENCE

- B-111 (Completed 10/4/91)
- T-111
- BX-103
- SY-101

NEAR-TERM TPA MILESTONES

NUMBER	MILESTONE	DATE
M-10-05	Issue "Integrated Plan - Sampling and Analysis of Hanford Wastes Measuring Greater than 10 mRem per Hour"	March 1992
M-10-06	Obtain 20 core samples from SSTs prior to September 1992	SEPT August 1992
M-10-00	Complete analyses of at least two complete core samples from each single-shell tank	Sept. 1998
M-10-13	Core sampling truck No. 2 ready for rotary mode drilling and hard salt cake sampling	Sept. 1992

INTERIM TPA MILESTONE M-10-05

"Integrated Plan - Sampling and Analysis of Hanford Wastes Measuring Greater Than 10 mRem/Hr"

REQUIREMENT:

Prepare a site-wide activity matrix that demonstrates sampling and analysis requirements versus capabilities supporting the characterization of the contents of High-Level Single-Shell Waste Tanks.

SCHEDULE:

Draft: January 31, 1992
Final: March 31, 1992

ROTARY MODE DEVELOPMENT

Tasks	Status
• Push Mode Bit	Complete
• Sludge Sampler & HC Bit	Complete
• Universal Sampler	
o Prototype Testing	
o Sludge/Hard Cake Contingency	
• Hard Cake Bit	
o Prototype / Los Alamos	
o Envelope Testing / Direct Bit Reading	

ROTARY MODE DEVELOPMENT

Tasks	Status
• NPH Reduction	
o Laboratory Clean Up	January 92
• Column Chromaticgraphic Separation	
o Elimination	
• Concept Tests	
• Detailed Design	
• Instrumentation	60% Mat./
o Supports Envelope Tests	30% Design
• Purge Gas	October 1 Start
• Develop Detailed Schedule	October 25, 91

AWARD FEE GOALS AND OBJECTIVES (10/1/91 to 3/31/92)

II.B.1.b. Aggressively identify and resolve safety issues associated with the 177 HLW tanks consistent with the established cost and schedule. Assure that high quality and timely safety assessments/evaluations and/or EA's are developed, as appropriate. Include non "watch list" tanks scheduled for intrusion (sampling) or transfer (pumping, receipt).

AWARD FEE GOALS AND OBJECTIVES (10/1/91 to 3/31/92)

II.B.1.f. Complete the development and operational deployment of a universal sampling system that can safely sample hard salt cake wastes, in addition to the sludge, liquid, and gaseous wastes that may be encountered within the tanks, one month in advance of the TPA milestone date of September 30, 1992. For this period, completion of full scale proof of principle testing, completion of definitive design, and completion of an acceptable, peer reviewed safety assessment utilizing bounding data from testing is considered essential to success.

AWARD FEE GOALS AND OBJECTIVES (10/1/91 to 3/31/92)

II.B.1.g Identify innovative methods and techniques for characterizing in-tank HLW that will significantly decrease the time and expenses projected for the SST waste characterization activity. Excellence will be achieved during this reporting period if a minimum of two, peer reviewed, innovative concepts are ready for formal presentation to the regulators, and the associated cost savings are documented.

AWARD FEE GOALS AND OBJECTIVES 10/1/91 to 3/31/92)

II.B.2.a.xv While maintaining safe operations and staying within the existing budget constraints, achieve increases in the productivity of the analytical laboratories. The management objective should be to achieve an increased rate of sample analyses (that meets regulatory requirements for quality) that is consistent with the rate at which samples are received at the analytical laboratory.

FY 1992 BUDGET

- Original ADS budget for FY 1992 was $16.5 million
- Current SST Characterization budget guidance is $12.8 million
- $2.7 million of current budget is new workscope - integrated plan and rotary mode/hardcake development
- Workscope includes:
  - core sampling (20 cores)
  - core sample analysis (approx. 8 cores)
  - tank characterization reports (for B-110 & U-110)
  - characterization planning support (partial funding)
  - SST database development
  - integrated plan
  - 2nd CST rotary mode/hardcake development and NPH elimination
  - analytical methods development (NPH cleanup, hard waste homogenization, initiate hot cell gamma scanner)
- Requests for additional funding will be made for the completion of core sample analyses and for additional characterization planning support

U. S. Department of Energy
Field Office, Richland

G. E. Bishop	R2-62
J. M. Clark	A4-02
P. K. Clark	A5-21
E. M. Mattlin	A4-02
S. L. Trine	A5-21

Westinghouse Hanford Company

K. Andringa	R2-12
R. E. Barker	H5-71
J. D. Berger	L0-18
G. N. Boechler	R1-17
M. A. Cahill	S4-57
J. R. Freeman-Pollard	H4-55
V. W. Hall	L4-88
J. R. Laws	H4-57
R. T. Miller	H4-57
M. J. Minette	R2-12
A. F. Noonan	R2-12
B. E. Opitz	R2-83
D. B. Pabst	B2-35
T. E. Rainey	R1-49
R. E. Raymond	R1-80
L. M. Sasaki	R2-12
E. H. Smith	B2-19
EDMC	H4-22

Pacific Northwest Laboratory

T. W. Wood	K6-25

State of Washington Department of Ecology

M. Lerchen	PV-11 Olympia, Washington

Stone and Webster Engineering Group

J. D. King	A4-35

U. S. Environmental Protection Agency

R. Sherwood	B5-01

"ENTIRE DIST." 6-3750 BJH
10:00AM DEC 0 6 1991